

PATENT ABSTRACTS OF JAPAN

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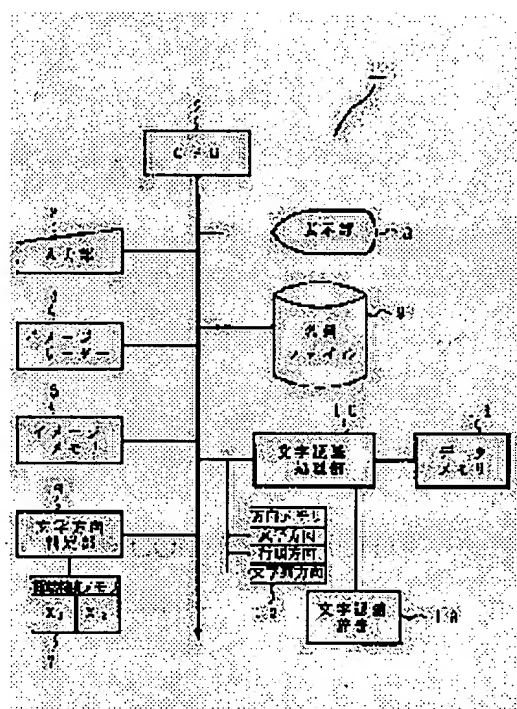
(54) CHARACTER RECOGNITION CONTROLLER

(57)Abstract:

PROBLEM TO BE SOLVED: To improve the processing speed of character recognition by the character recognition controller.

SOLUTION: To begin with an image reader 5 reads a source document image, and a character direction decision part 6 decides from the read source document image the character string direction and the head direction in the direction crossing the character string direction at right angles, and decides a character direction (character facing direction) according to the decided character string direction and head direction.

Then a character recognition processing part 10 performs character recognition as to the whole or part of the source document image according to the character direction decided by the character direction decision part 6.



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CLAIMS

[Claim(s)]

[Claim 1] An image read means to read a manuscript image, and a direction judging means of a character string to judge the direction of a character string from the image read with said image read means, A direction judging means of the head of the sentence to judge the direction of the head of the sentence in said direction of a character string, and the direction which intersects perpendicularly from the image read with said image read means, A direction judging means of an alphabetic character to judge the direction of an alphabetic character from the image read with said image read means based on the judgment result of said direction judging means of a character string, and said direction judging means of the head of the sentence, The character recognition control unit characterized by providing a character recognition means to perform character recognition to the image read with said image read means, based on the direction of an alphabetic character judged with said direction judging means of an alphabetic character.

[Claim 2] When it is judged with the direction of a character string being width by said direction judging means of a character string and judges that the direction of the head of the sentence is the left with said direction judging means of the head of the sentence, said direction judging means of an alphabetic character The "left" or a "top" is judged among each vertical and horizontal alphabetic character sense candidate to be the direction of an alphabetic character. When it is judged with the direction of a character string being width by said direction judging means of a character string and is judged with the direction of the head of the sentence being the right by said direction judging means of the head of the sentence The "right" or the "bottom" is judged among each vertical and horizontal alphabetic character sense candidate to be the direction of an alphabetic character. When it is judged with the direction of a character string being length by said direction judging means of a character string and is judged with the direction of the head of the sentence being a top by said direction judging means of the head of the sentence The "right" or a "top" is judged among each vertical and horizontal alphabetic character sense candidate to be the direction of an alphabetic character. When it is judged with the direction of a character string being length by said direction judging means of a character string and is judged with the direction of the head of the sentence being the bottom by said direction judging means of the head of the sentence The character recognition control unit according to claim 1 characterized by judging the "left" or the "bottom" to be the direction of an alphabetic character among each vertical and horizontal alphabetic character sense candidate.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]**[0001]**

[Field of the Invention] This invention relates to the character recognition control unit equipped with the character recognition means.

[0002]

[Description of the Prior Art] Conventionally, the printed manuscript is read as an image data using an image scanner etc., and the character recognition control unit which performs character recognition, such as an alphabetic character and a kanji, and character-code-izes an alphabetic character is used in document preparation equipments, such as a personal computer and a word processor, from the image data. Character recognition processing of this character recognition control device is performed per one character on the read manuscript image, and the content of an output of the recognized alphabetic data is constituted by a character code and the coordinate positional information of the alphabetic character on an image.

[0003] Moreover, it faced performing character recognition processing, and per alphabetic character, from the four directions of vertical and horizontal, character recognition was performed, respectively, it was sure that the high direction of the reliability of a recognition result is the direction of an alphabetic character, and the recognition result in the direction was outputted as a character code.

[0004]

[Problem(s) to be Solved by the Invention] However, if it is in ** et al. and this conventional character recognition control unit, there is a problem that are an alphabetic character unit, and a process speed becomes slow and working efficiency worsens since character recognition is performed, respectively, it is sure that the high direction of the reliability of a recognition result is the direction of an alphabetic character (the alphabetic character sense direction), the recognition result in the direction is used as the character code and it is necessary to carry out character recognition about four directions for every alphabetic character from the four directions of vertical and horizontal. Then, this invention is made that the above-mentioned problem should be solved, and makes it the technical problem to improve the processing speed of the character recognition of a character recognition control unit.

[0005]

[Means for Solving the Problem] An image read means by which a character recognition control device according to claim 1 reads a manuscript image, A direction judging means of a character string to judge the direction of a character string from the image read with said image read means, A direction judging means of the head of the sentence to judge the direction of the head of the sentence in said direction of a character string, and the direction which intersects perpendicularly from the image read with said image read means, A direction judging means of an alphabetic character to judge the direction of an alphabetic character from the image read with said image read means based on the judgment result of said direction judging means of a character string, and said direction judging means of the head of the sentence, The above-mentioned technical problem is solved by providing a character recognition means to perform character recognition to the image read with said image read means, based on the direction of an

alphabetic character judged with said direction judging means of an alphabetic character.

[0006] According to the character recognition control device according to claim 1, images, such as text, are first read with an image read means. Namely, subsequently The direction of a character string and the direction of the head of the sentence of an image which were read are judged with the direction judging means of a character string, and the direction judging means of the head of the sentence, respectively. The direction judging means of an alphabetic character Based on the judgment result of this direction judging means of a character string, and the direction judging means of the head of the sentence, the high direction of an alphabetic character of possibility is judged from the candidate of two or more alphabetic character sense directions. Subsequently a character recognition means Based on the direction of an alphabetic character judged by the direction judging means of an alphabetic character, character recognition to the whole manuscript image read with said image read means or a part is performed, and a character recognition rate is raised. Therefore, the reason and an operator's actuation effectiveness whose speed of character recognition can improve improve.

[0007] In this case, like a character recognition control unit according to claim 2 moreover, said alphabetic character sense direction judging means When it is judged with the direction of a character string being width by said direction judging means of a character string and is judged with the direction of the head of the sentence being the left by said direction judging means of the head of the sentence The "left" or a "top" is judged among each vertical and horizontal alphabetic character sense candidate to be the direction of an alphabetic character. When it is judged with the direction of a character string being width by said direction judging means of a character string and is judged with the direction of the head of the sentence being the right by said direction judging means of the head of the sentence The "right" or the "bottom" is judged among each vertical and horizontal alphabetic character sense candidate to be the direction of an alphabetic character. When it is judged with the direction of a character string being length by said direction judging means of a character string and is judged with the direction of the head of the sentence being a top by said direction judging means of the head of the sentence The "right" or a "top" is judged among each vertical and horizontal alphabetic character sense candidate to be the direction of an alphabetic character. When it is judged with the direction of a character string being length by said direction judging means of a character string and is judged with the direction of the head of the sentence being the bottom by said direction judging means of the head of the sentence, you may decide to judge the "left" or the "bottom" among each vertical and horizontal alphabetic character sense candidate to be the direction of an alphabetic character.

[0008] According to the character recognition control unit according to claim 2, namely, the alphabetic character sense direction judging means concerned When it is judged with the direction of a character string being width and is judged with the direction of the head of the sentence being the left When the "left" or a "top" is judged among each vertical and horizontal alphabetic character sense candidate to be the direction of an alphabetic character, it is judged with the direction of a character string being width and it is judged with the direction of the head of the sentence being the right When the "right" or the "bottom" is judged to be alphabetic character *****, it is judged with the direction of a character string being length and it is judged with the direction of the head of the sentence being a top When the "right" or a "top" is judged among each vertical and horizontal alphabetic character sense candidate to be the direction of an alphabetic character, it is judged with the direction of a character string being length and it is judged with the direction of the head of the sentence being the bottom, the "left" or the "bottom" is judged to be the direction of an alphabetic character. Therefore, in addition to effectiveness according to claim 1, the direction of an alphabetic character can be judged at a simple direction and simple high speed.

[0009]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained, referring to drawing 1 thru/or 6. First, a configuration is explained. Drawing 1 is the block diagram of one example of the character recognition control device with which this invention is applied. drawing 1 - - setting -- the character recognition control device 1 -- CPU (arithmetic and program control)2, the input section 3, an image reader 4, image memory 5, the direction judging section 6 of an alphabetic

character, the recognition precision memory 7 and a display 8, the character recognition processing section 10, data memory 11, the direction memory 12, and the character recognition dictionary 13 -- since -- it is constituted and each part of each other is connected through the bus line 14.

[0010] CPU2 controls each part of a character recognition control unit according to the various control programs stored in ROM which is not illustrated, performs various character recognition processings, and displays the processing process and a processing result on a display 8. Moreover, CPU2 performs document reading processing mentioned later according to the document reading processing program stored in ROM which is not illustrated according to directions of the input section 3.

[0011] Specifically, CPU2 stores in image memory 5 first the image data which the image reader 4 was made to read the image of manuscripts, such as a business card, and was read. Subsequently, the direction judging section 6 of an alphabetic character is made to perform the direction judging processing of an alphabetic character, and while making the direction of a character string of a manuscript (a line writing direction or the direction of a train) judge from the read image data, the direction of an alphabetic character (the alphabetic character sense direction) is made to judge based on the direction of a character string and the direction of the head of the sentence which were made to judge the direction of the head of the sentence in the judged direction of a character string, and the direction which intersects perpendicularly, and were these-judged. Furthermore, the character recognition section 10 is made to perform character recognition processing, character recognition processing is performed about the read image data based on the direction of an alphabetic character judged in the direction judging section 6 of an alphabetic character, and the character code of the recognized image data (alphabetic data), the coordinate positional information of the alphabetic character on an image, etc. are made to store in data memory 11 (each data of the alphabetic character point size of each character code, a row pitch, the average digit pitch between alphabetic characters, a top margin, and a left margin).

[0012] Moreover, CPU2 stores in the business-card file 9 the character code stored in data memory 11, the coordinate positional information of the alphabetic character on an image, etc. per business card. The input section 3 is equipped with a cursor key, a figure input key, an alphabetic character input key, a function key, etc., and outputs the depression signal of the pressed key to CPU2.

[0013] An image reader 4 scans the screen top for reading at a predetermined rate, reads for example, line image sensors with line image sensors for every line, and supplies an image data to image memory 5. Image memory 5 forms the memory area which stores the image data of the reading manuscript inputted from an image reader 4.

[0014] The direction judging section 6 of an alphabetic character performs the direction judging processing of an alphabetic character by control of CPU2. First, the direction of a character string and the direction of the head of the sentence of an image data which were read by the image reader 4 and stored in image memory 5 are judged. Based on the direction of a character string and the direction of the head of the sentence which were judged, by referring to the character recognition dictionary 13 about each alphabetic character direction, character recognition is performed, recognition precision is computed about each alphabetic character direction, respectively, and the direction of an alphabetic character where recognition precision is high is decided as a direction of an alphabetic character.

[0015] Moreover, the direction judging section 6 of an alphabetic character stores the computed character recognition precision in the recognition precision memory 7 while storing the judged direction of a character string, the direction of the head of the sentence, and the direction of an alphabetic character in the direction memory 12. The recognition precision memory 7 forms the memory area for storing the result of the recognition precision computed by the direction judging section 6 of an alphabetic character.

[0016] A display 8 displays a processing process, a processing result, etc. of various processings which are performed by CPU2. The character recognition processing section 10 performs character recognition processing by control of CPU2. Based on the direction of an alphabetic character judged by the alphabetic character judging processing section 6, the alphabetic character extracted from the image data stored in image memory 5 is recognized. The character code corresponding to the recognized alphabetic character is read from a character recognition dictionary, and it stores in data memory 11 with the

coordinate positional information of an alphabetic character etc. (each data of alphabetic character point size, a row pitch, the average digit pitch between alphabetic characters, a top margin, and a left margin). [0017] Also since data memory 11 stores a character code, coordinate positional information, etc. of an alphabetic character which have been recognized by character recognition processing performed by the character recognition processing section 10 (each data of alphabetic character point size, a row pitch, the average digit pitch between alphabetic characters, a top margin, and a left margin), it forms a memory area. The direction memory 12 forms the memory area for storing data, such as the direction of a character string of the image data judged by the direction judging section 6 of an alphabetic character, the direction of the head of the sentence, and the direction of an alphabetic character.

[0018] The character recognition dictionary 13 stores character code data, and in the direction judging processing of an alphabetic character performed by the direction judging section 6 of an alphabetic character, in case it computes the recognition precision of an alphabetic character, it is used in the case of character recognition processing of the character recognition processing section 10. The business-card file 9 forms the memory area for storing a character code, coordinate positional information, etc. which were stored in data memory 11 per business card (each data of alphabetic character point size, a row pitch, the average digit pitch between alphabetic characters, a top margin, and a left margin) as a result of character recognition processing of the character recognition processing section 10.

[0019] Next, actuation is explained. First, the document reading processing performed by CPU2 is explained with reference to drawing 4 and drawing 5 based on the flow chart shown in drawing 2. Drawing 2 is a flow chart for explaining the document reading processing performed by CPU2.

Especially in this example, reading processing of the image data of a business card is explained. CPU2 makes the image data of a business card read, stores the read image data in image memory 5 (step S1), subsequently to the direction judging section 6 of an alphabetic character, makes an image reader 4 perform the direction judging processing of an alphabetic character, and makes it first judge the direction of a character string, the direction of the head of the sentence, and the direction of an alphabetic character of this read image data in drawing 2 (step S2).

[0020] This direction judging processing of an alphabetic character is explained to a detail with reference to drawing 5 and drawing 6 based on the flow chart shown in drawing 3 and drawing 4 R> 4. Drawing 3 and drawing 4 are flow charts for control of CPU2 to explain the direction judging processing of an alphabetic character performed by the direction judging section 6 of an alphabetic character.

[0021] Drawing 5 is drawing for explaining the stroke which judges the direction of a character string and the direction of the head of the sentence of the direction judging processing of an alphabetic character. Drawing 6 is drawing for explaining the stroke which judges the direction of an alphabetic character of the direction judging processing of an alphabetic character. By the way, it is necessary to recognize the distinction with these columnar writing and lateral writing of a character string, i.e., the direction, and in Japanese, since there are columnar writing and lateral writing, as shown for example, in drawing 6 (A) - (H), eight kinds of directions of an alphabetic character (the alphabetic character sense direction) can be further, considered according to the direction of a manuscript.

[0022] In drawing 3, first, it is read by the image reader 4, and the image data of a business card as shown in drawing 5 (A) divides into a line block the image data stored in image memory 5 like drawing 5 (B), and judges from the text layout of the image data in which it was stored by image memory 5, the direction of a character string, i.e., direction, of this line block, (step S11). As shown in drawing 5 (B), when the direction of a character string (the line block direction) is a longitudinal direction, while judging the direction of a character string to be a longitudinal direction and shifting to step S12, when it judges with the direction of a character string being a lengthwise direction, it shifts to step S31 of drawing 14.

[0023] Subsequently, in step S12, the left or the right is analyzed from the text layout of an image data, the direction of a line set of the head of the sentence, i.e., direction, of a line block in the judged direction of a character string (longitudinal direction), and the direction which intersects perpendicularly, and it judges the direction which has complete set of line to be the direction of the head

of the sentence (step S12). In this case, as shown in drawing 5 (B), when the direction of the head of the sentence is the left, while the direction of the head of the sentence judges that it is the left and shifts to step S13, when it is judged that the direction of the head of the sentence is the right, it shifts to step S14. [0024] In addition, when the direction of the head of the sentence is intermingled the right and leftward, the direction of a side with much grand total of the direction of the head of the sentence is decided with the direction of the head of the sentence. The case where they are the case where the direction of an alphabetic character is the "left", and the "right" as shown in drawing 6 (A) and (B) when it is judged in step S12 that the direction of the head of the sentence is the left thinks, and it is ****.

[0025] In step 13, character recognition is first performed by making the direction of an alphabetic character into a "top" (step S13). Then, the recognized alphabetic character, The alphabetic character which performed the comparison (pattern matching) with the criteria alphabetic character beforehand stored in the character recognition dictionary 13, and has been recognized, It stores in the recognition precision memory 7, computing, similarity, i.e., recognition precision, with the alphabetic character most approximated to the alphabetic character recognized in this criteria alphabetic character, and using acquired recognition precision as X1 (step S14).

[0026] Character recognition is performed by making the direction of an alphabetic character into the "left" (step S15). Subsequently, the recognized alphabetic character, The alphabetic character which performed the comparison (pattern matching) with the criteria alphabetic character beforehand stored in the character recognition dictionary 13, and has been recognized, It stores in the recognition precision memory 7, computing, similarity, i.e., recognition precision, with the alphabetic character most approximated to the alphabetic character recognized in this criteria alphabetic character, and using acquired recognition precision as X2 (step S14).

[0027] And at step S17, the recognition precision X1 and X2 stored in the recognition precision memory 7 is measured, the direction where recognition precision is high is decided as a direction of an alphabetic character (step S17), the direction judging processing of an alphabetic character concerned is ended, and it shifts to character recognition processing of step S3 of drawing 2. The case where they are the case where the direction of an alphabetic character is the "right", and the "bottom", on the other hand as shown in drawing 6 (C) and (D) when it is judged in step S12 that the direction of the head of the sentence is the right thinks, and it is ****.

[0028] In step 18, character recognition is first performed by making the direction of an alphabetic character into the "bottom" (step S18). Then, the recognized alphabetic character, The alphabetic character which performed the comparison (pattern matching) with the criteria alphabetic character beforehand stored in the character recognition dictionary 13, and has been recognized, It stores in the recognition precision memory 7, computing, similarity, i.e., recognition precision, with the alphabetic character most approximated to the alphabetic character recognized in this criteria alphabetic character, and using acquired recognition precision as X1 (step S19).

[0029] Character recognition is performed by making the direction of an alphabetic character into the "right" (step S20). Subsequently, the recognized alphabetic character, The alphabetic character which performed the comparison (pattern matching) with the criteria alphabetic character beforehand stored in the character recognition dictionary 13, and has been recognized, It stores in the recognition precision memory 7, computing, similarity, i.e., recognition precision, with the alphabetic character most approximated to the alphabetic character recognized in this criteria alphabetic character, and using acquired recognition precision as X2 (step S21), and shifts to step S17.

[0030] moreover, when it is judged in step S11 that the direction of a character string (line block) is a lengthwise direction Shift to step S31 shown in drawing 4, and the judged direction of a character string (lengthwise direction) and the direction of the head of the sentence in the direction which intersects perpendicularly analyze "above" and down ["down"] from the text layout of an image data. When the direction which has complete set of line is judged to be the direction of the head of the sentence (step S31) and it judges with the direction of the head of the sentence being above, while shifting to step S32, when it is judged that the direction of the head of the sentence is down, it shifts to step S36.

[0031] The case where they are the case where the direction of an alphabetic character is a "top", and the

"right" as shown in drawing 6 (E) and (F) when it is judged in step S31 that the direction of the head of the sentence is above thinks, and it is ****.

[0032] In step 32, character recognition is first performed by making the direction of an alphabetic character into a "top" (step S32). Then, the recognized alphabetic character, The alphabetic character which performed the comparison (pattern matching) with the criteria alphabetic character beforehand stored in the character recognition dictionary 13, and has been recognized, It stores in the recognition precision memory 7, computing, similarity, i.e., recognition precision, with the alphabetic character most approximated to the alphabetic character recognized in this criteria alphabetic character, and using acquired recognition precision as X1 (step S33).

[0033] Character recognition is performed by making the direction of an alphabetic character into the "right" (step S34). Subsequently, the recognized alphabetic character, The alphabetic character which performed the comparison (pattern matching) with the criteria alphabetic character beforehand stored in the character recognition dictionary 13, and has been recognized, It stores in the recognition precision memory 7, computing, similarity, i.e., recognition precision, with the alphabetic character most approximated to the alphabetic character recognized in this criteria alphabetic character, and using acquired recognition precision as X2 (step S34), and shifts to step S17 of drawing 3.

[0034] The case where they are the case where the direction of an alphabetic character is the "bottom", and the "left" as shown in drawing 6 (G) and (H) when it is judged in step S31 that the direction of the head of the sentence is down thinks, and it is ****.

[0035] In step 36, character recognition is first performed by making the direction of an alphabetic character into the "bottom" (step S36). Then, the recognized alphabetic character, The alphabetic character which performed the comparison (pattern matching) with the criteria alphabetic character beforehand stored in the character recognition dictionary 13, and has been recognized, It stores in the recognition precision memory 7, computing, similarity, i.e., recognition precision, with the alphabetic character most approximated to the alphabetic character recognized in this criteria alphabetic character, and using acquired recognition precision as X1 (step S37).

[0036] Character recognition is performed by making the direction of an alphabetic character into the "left" (step S38). Subsequently, the recognized alphabetic character, The alphabetic character which performed the comparison (pattern matching) with the criteria alphabetic character beforehand stored in the character recognition dictionary 13, and has been recognized, It stores in the recognition precision memory 7, computing, similarity, i.e., recognition precision, with the alphabetic character most approximated to the alphabetic character recognized in this criteria alphabetic character, and using acquired recognition precision as X2 (step S39), and shifts to step S17 of drawing 3.

[0037] And in step 3 of drawing 2, CPU2 makes the character recognition processing section 10 perform character recognition processing, and the character recognition processing section 10 is the direction of an alphabetic character decided at step S17 of drawing 3 by the direction judging section 6 of an alphabetic character, and performs character recognition to the whole manuscript image read in the manuscript. The alphabetic character extracted from the manuscript image data specifically stored in image memory 5 based on the direction of an alphabetic character decided at step S17 of drawing 3 is recognized. The recognized alphabetic character, The alphabetic character which performed the comparison (pattern matching) with the criteria alphabetic character beforehand stored in the character recognition dictionary 13, and has been recognized, The character code of the alphabetic character most approximated to the alphabetic character recognized in this criteria alphabetic character, the coordinate positional information of the alphabetic character on an image, etc. are stored in data memory 11 (step S3). In step S4, CPU2 stores in a business-card file the character code stored in data memory 11, the coordinate positional information of the alphabetic character on an image, etc. per business-card (step S4), and ends the document reading processing concerned.

[0038] In the above-mentioned example, it is the limited direction of an alphabetic character, and it is the alphabetic character unit like a reason, and the conventional character recognition control unit which is the configuration of performing character recognition of the whole manuscript image, and from the four directions of vertical and horizontal, as compared with the approach of performing character

recognition, respectively, the count of recognition decreases, the process speed of character recognition is gone up, and an operator's working efficiency improves. Moreover, in the above-mentioned example, since this direction of an alphabetic character is judged based on the direction of a character string, the direction of an alphabetic character, and character recognition precision, it is a simple approach, and is accurate, and the direction of an alphabetic character can be judged.

[0039] In addition, in the above-mentioned example, although the case where a business card was read was explained, you may decide not to limit this invention to this and to read a postcard, the usual document data, etc. Moreover, in the above-mentioned example, although the case where Japanese was read was explained, you may decide not to limit this invention to this and to read English etc.

[0040] Moreover, in the above-mentioned example, although it is the limited direction of an alphabetic character and being carried out for performing character recognition of the whole manuscript image, you may decide to carry out character recognition in the direction of an alphabetic character which limited a part of manuscript image. Moreover, in the above-mentioned example, although pattern matching is performing character recognition processing, character recognition processing may be performed by the structural-analysis method.

[0041]

[Effect of the Invention] As explained above, according to the character recognition control device according to claim 1, the reason and the count of recognition which are the configuration of performing the whole manuscript image or a part of character recognition decrease in the limited direction of an alphabetic character, the process speed of character recognition is gone up, and it becomes possible to raise an operator's working efficiency.

[0042] Moreover, according to the character recognition control unit according to claim 2, since the direction of an alphabetic character is judged based on the direction of a character string, the direction of an alphabetic character, and character recognition precision, it is a simple approach, and is accurate, and the direction of an alphabetic character can be judged.

[Translation done.]

[0040] Moreover, in the above-mentioned example, although it is the limited direction of an alphabetic character and being carried out for performing character recognition of the whole manuscript image, you may decide to carry out character recognition in the direction of an alphabetic character which limited a part of manuscript image. Moreover, in the above-mentioned example, although pattern matching is performing character recognition processing, character recognition processing may be performed by the structural-analysis method.

[Effect of the Invention] As explained above, according to the character recognition control device according to claim 1, the reason and the count of recognition which are the configuration of performing the whole manuscript image or a part of character recognition decrease in the limited direction of an alphabetic character, the process speed of character recognition is gone up, and it becomes possible to raise an operator's working efficiency.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] The block diagram of the character recognition control device which applied this invention

[Drawing 2] It is the flow chart of an explanation **** sake about the document read in processing performed by CPU of drawing 1.

[Drawing 3] The 1st flow chart for explaining the alphabetic character judging processing performed by the direction judging section of an alphabetic character of drawing 1.

[Drawing 4] The 2nd flow chart for explaining the alphabetic character judging processing performed by the direction judging section of an alphabetic character of drawing 1.

[Drawing 5] Drawing for explaining the stroke which judges the direction of a character string and the direction of the head of the sentence in the direction judging processing of an alphabetic character performed by the direction judging section of an alphabetic character of drawing 1.

[Drawing 6] Drawing for explaining the stroke which judges the direction of an alphabetic character in the direction judging processing of an alphabetic character performed by the direction judging section of an alphabetic character of drawing 1.

[Description of Notations]

1 Character Recognition Control Unit

2 CPU

3 Input Section

4 Image Reader

5 Image Memory

6 The Direction Judging Section of Alphabetic Character

7 Recognition Precision Memory

8 Display

9 Business-Card File

10 Character Recognition Processing Section

11 Data Memory

12 Direction Memory

13 Character Recognition Dictionary

[Translation done.]

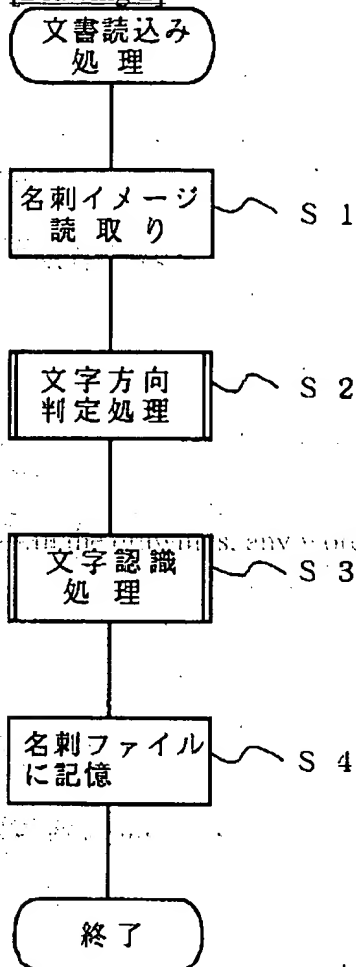
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3. In the drawings, any words are not translated.

DRAWINGS

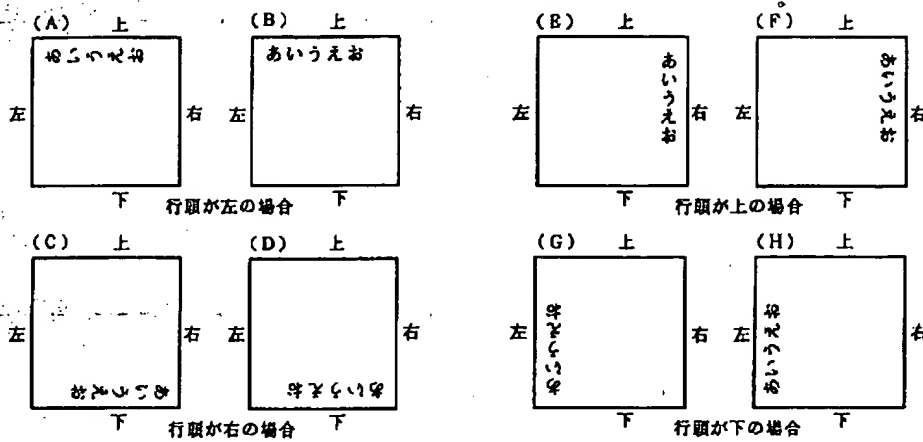
[Drawing 2]



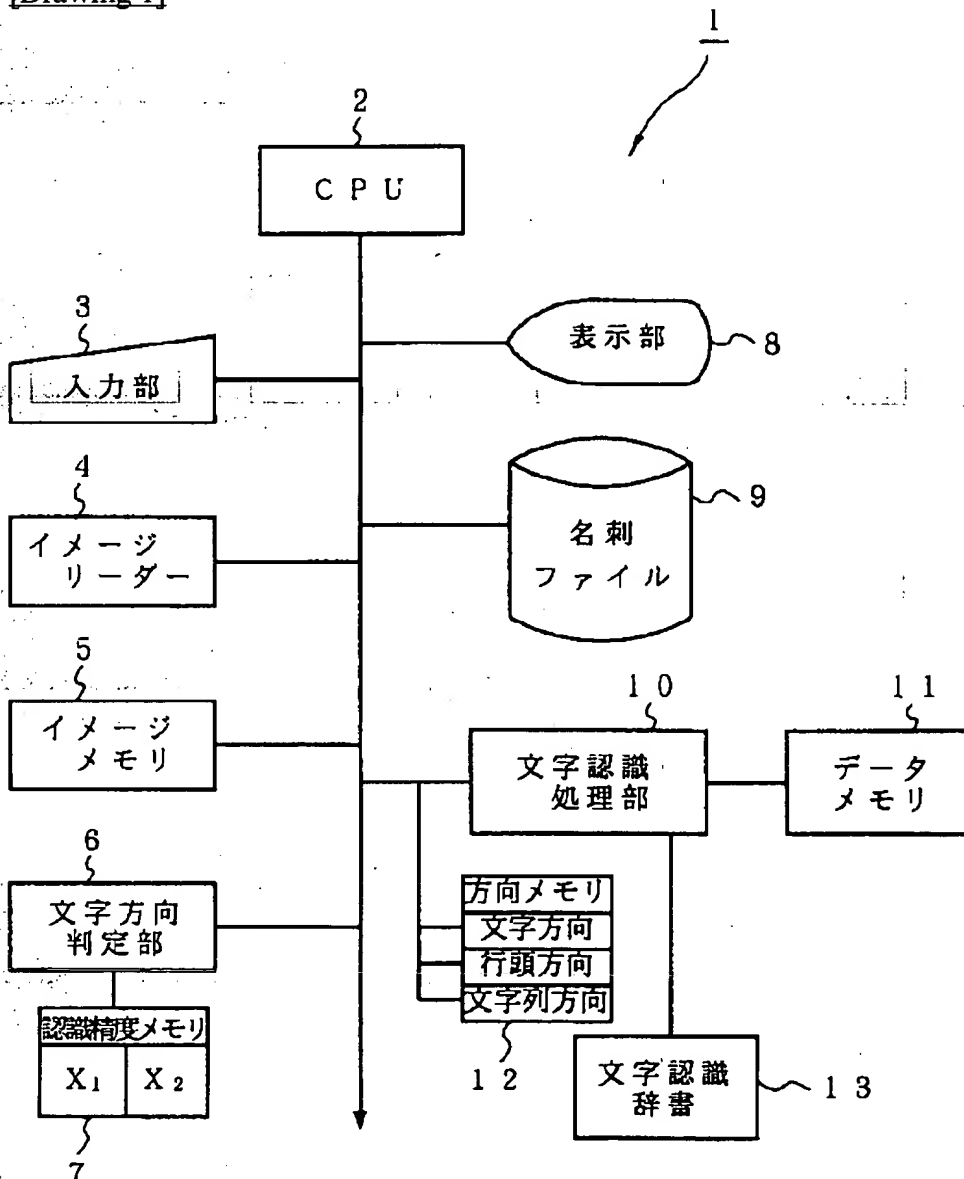
[Drawing 6]

判定処理

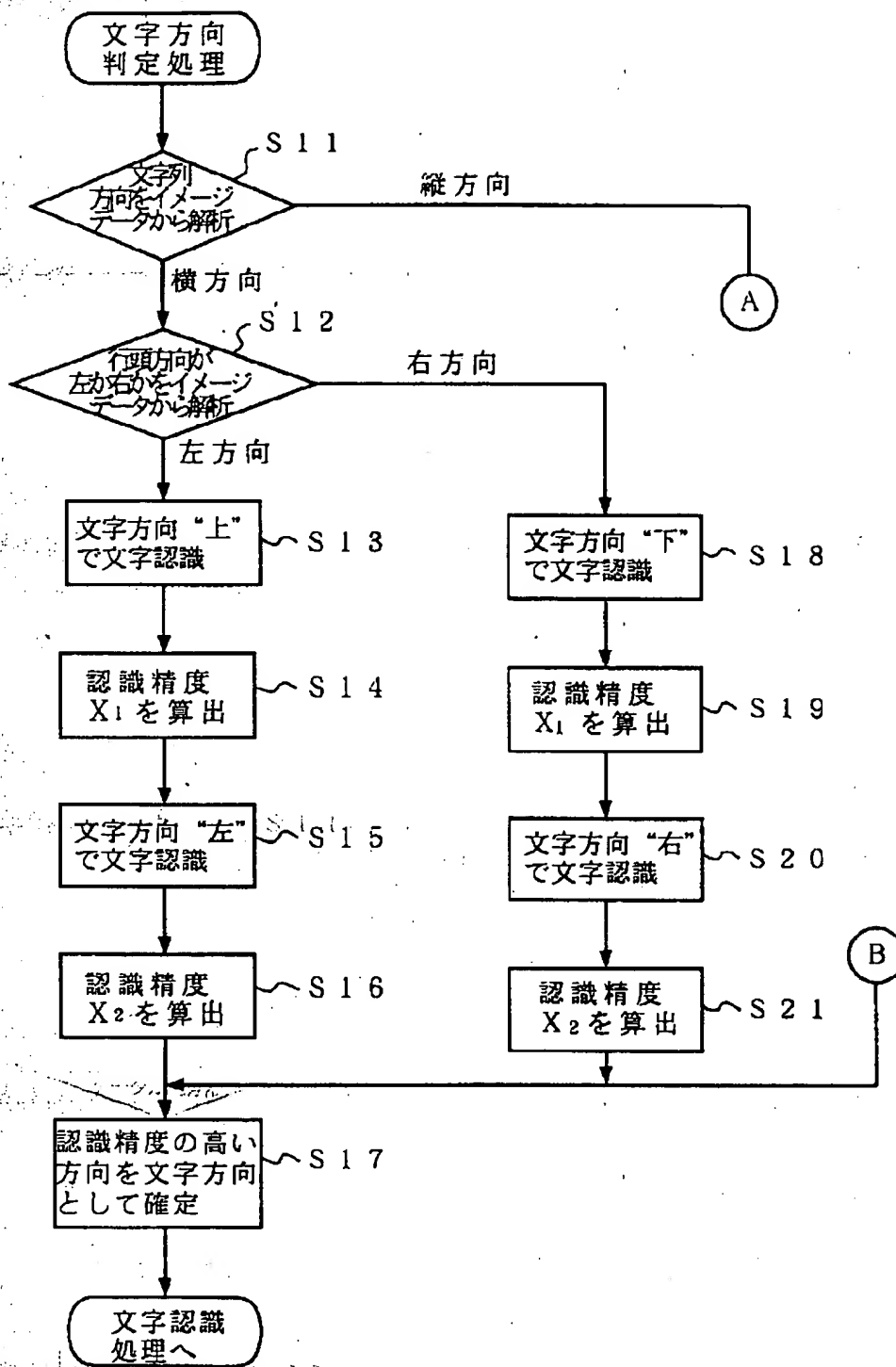
行頭位置から、可能な文字方向を限定する



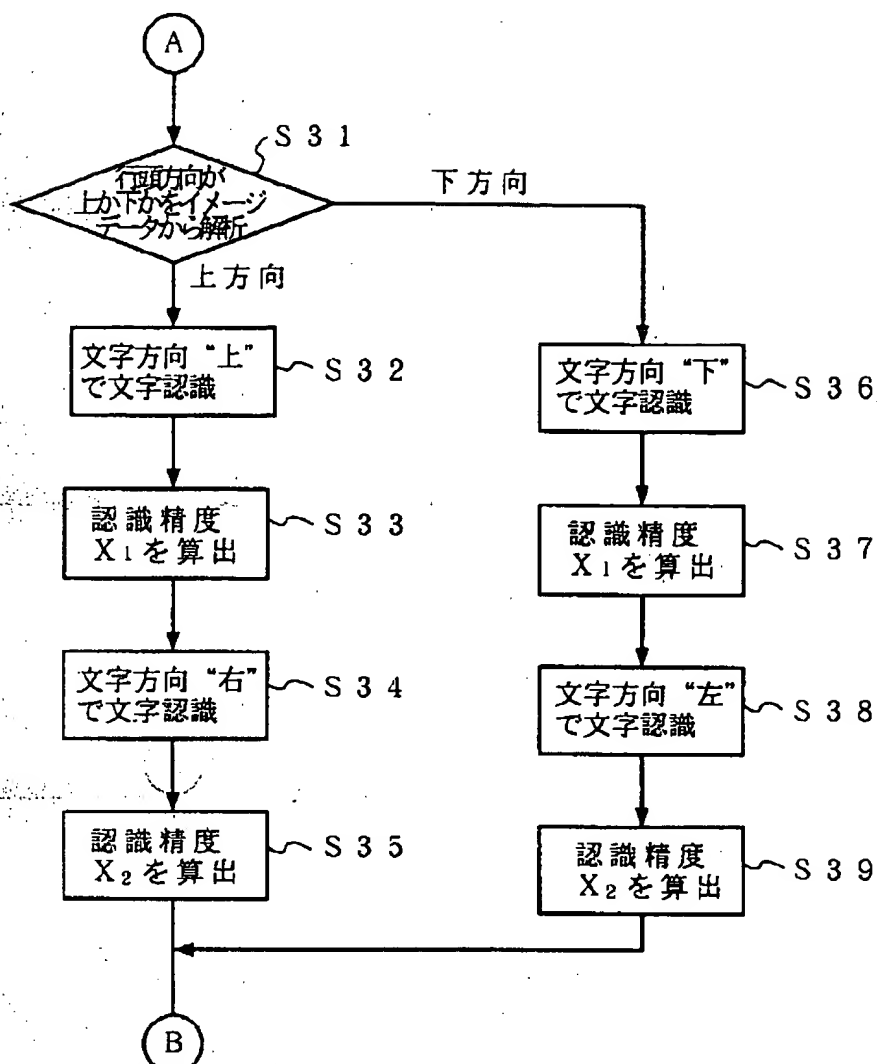
[Drawing 1]



[Drawing 3]



[Drawing 4]



[Drawing 5]

文書レイアウトから、行頭位置を確定する

(A)

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左

行へ分割

(B)

上

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下

行の揃う位置
行頭を左と確定する。

[Translation done.]